

Remarks

In the instant application, claims 1-10 and 12 are pending. Reconsideration of the pending claims in view of the following remarks is respectfully requested.

Rejection under 35 U.S.C. § 103

Claims 1-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Rauchschalbe et al. (US Pat. Pub. No. 2001/0034453 (hereinafter referred to as “453”) in view of Merz et al. (*Journal for Praktische Chemie*, 1996, 672-674) (hereinafter referred to as “Merz”).

The ‘453 publication, as best understood by the Applicants, discloses a decarboxylating process of 3,4 dialkoxythiophene-2,5-dicarboxylic acid where the decarboxylation is carried out in a solvent having a higher boiling point than the decarboxylated product and where the decarboxylated product is finally obtained by distillation of the product from the solvent. *See the ‘453 publication paragraphs [0021] – [0022]*. In contrast, claim 1 features thermal decarboxylation of 3,4 dialkoxythiophene-2,5-dicarboxylic acid as a solid in the presence of fluidized bed bodies, in the absence of solvent and discharging the product from the reaction zone in gaseous form. The Office Action opines that the ‘453 publication does in fact teach discharging the product in gaseous form by distillation, citing example 4 of the ‘453 publication. In example 4 of the ‘453 publication, the starting reactant is added to sulfolane (solvent) and reacted. Subsequently, example 4 provides that the 3,4-Dimethoxythiophene is distilled off using a small column at a bottom temperature of 145°C and a top temperature of 130°C. *See the ‘453 publication, paragraph [0047]*. Therefore, in the ‘453 publication, the product is formed in solvent and must be separated in a separate step via distillation. In contrast, claim 1 does not feature a distillation. Claim 1 features reacting the starting material in solid form and removing the product from the reaction zone in gaseous form. Further, instant claim 1 provides that the starting material is reacted in solid form in the presence of fluidized-bed bodies in the absence of solvents and the decarboxylation product is discharged from the reaction zone in gaseous form. The reaction of instant claim 1 is carried out in the gaseous form whereas the reaction of the ‘453 publication discloses

discharging the product in gaseous form by distillation after the decarboxylation. This provides an additional distillation step and, further, is not featured in the instant claim 1.

Merz, on the other hand, does not add to the '453 publication to teach every feature of instant claim 1. Merz discloses the decarboxylation of 2,5-dicarboxy-3,4-dimethoxythiophene by exposing the compound to high heat. However, Merz does not teach that the reaction product is removed from the reaction zone in the gaseous form, as recited in claim 1. The Office Action opines that the teaching of Merz is cited to supplement the '453 publication in order to show a decarboxylation starting with a solid. Merz teaches heating the reactant to a temperature of $>250^{\circ}\text{C}$ where a yellow-brown oil is obtained. This oil is distilled to give a colorless oil that solidifies to crystals of desired product. *See Merz, first full paragraph, second column, page 673.* There is no mention in Merz of discharging the decarboxylation product formed from the reaction zone in gaseous form, as featured in claim 1. In fact, Merz specifically states that a distillation of the final oil is needed to obtain the final product. *See Merz, first full paragraph, second column, page 673.* As noted, instant claim 1 does not feature a distillation. As such, Merz still requires the additional step of distillation. Therefore, Merz does not add to the '453 publication to teach all the features of instant claim 1.

The Office further contends that the '453 publication does not teach away from Merz by referencing such in paragraph [0005] of the '453 publication. However, the '453 publication states in this section that the product is obtained in a mixture and must be separated in a complex manner, i.e., in a number of steps. *See paragraph [005] of the '453 publication.* This statement along with the fact that in Merz a yield of only 65% compared to a yield of 86.7% (as in example 4 of the '453 publication) would not lead one skilled in the art to combine Merz with the '453 publication. If higher yields are obtained in the process recited in the '453 publication, one skilled in the art would not be persuaded to combine the references, as only a lower yield could be expected.

The Office's main argument is that the distillation found in '453 publication and/or Merz teaches the feature of instant claim 1 where the product is discharged from the reaction zone in gaseous form. However, in instant claim 1, the product is formed and discharged as the product. Both the '453 publication and Merz teach a specific step of

distillation. In the '453 publication, the product is distilled from the solvent and in Merz, the resultant oil must be distilled to obtain the final product. As stated, instant claim 1 does not provide for a solvent or a distillation step. Instant claim 1 features a starting reactant in solid form, not solvents and discharging the product once it is formed. This is not alluded to in either of the references and one skilled in the art would not consider the distillation found in the cited references obvious to the reaction of claim 1.

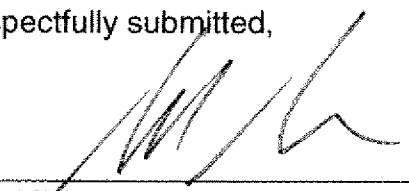
Moreover, even if one of skill in the art would, for the sake of argument, combine Merz with the '453 publication, they still would not arrive at the features of instant claim 1. As stated, both the '453 publication and Merz require a distillation step which is not featured in instant claim 1. Instant claim 1 provides for reacting the starting material as a solid in the absence of solvents and discharging the product from the reaction zone in gaseous form. This is not contemplated by the references individually or in combination. Moreover, neither of the cited references disclose that a decarboxylation product can be obtained in high yields in a process where the starting material is a solid and reacted in the presence of a plurality of fluidized bodies wherein the product is discharged from the reaction zone in gaseous form. The present invention produced yields of >90%. *See instant Specification, Examples.* This is not found in either of the references or in a combination of the references. As such, Applicants believe that one of skill in the art would not find instant claim 1 obvious in view of cited references. Withdrawal of the rejection of instant claim 1 is respectfully requested.

Claims 2-10 and 12 either directly or indirectly depend from claim 1 and are patentable over the cited references for at least the same reasons as set forth in claim 1. Withdrawal of the rejection of these claims is respectfully requested.

The USPTO is hereby authorized to charge any fees for an extension of time or those under 37 C.F.R. 1.16 or 1.17, which may be required by this paper, and/or to credit any overpayments to Deposit Account No. 50-2527.

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